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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/539,133

06/15/2005

Kazushi Wada

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02/17/2009

SONNENSCHN NATH & ROSENTHAL LLP

P.O. BOX 061080

WACKER DRIVE STATION, SEARS TOWER

CHICAGO, IL 60606-1080

EXAMINER

KUO, WENSING W

ART UNIT

PAPER NUMBER

2826

MAIL DATE

DELIVERY MODE

02/17/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/539,133

Applicant(s)

WADA, KAZUSHI

Examiner

W. Wendy Kuo

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 November 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 12-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11 November 2008 has been entered.
2. Claims 1-20 are pending. Claims 12-20 stand withdrawn from further consideration as being directed to a non-elected invention.

Drawings and Specification

3. Amendments to the specification filed on 09 July 2008 are acknowledged and accepted. Thus, the objections with respect to Figure 2 indicated in the Office action dated 28 May 2008 are withdrawn.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claims 1-4, 6-7, and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Inagaki (US 6,765,246) (hereinafter Inagaki).**

6. **With respect to claim 1, Inagaki (e.g. Figure 1) teaches a solid state image pickup device comprising:**

- a semiconductor region 7 formed on a substrate 5 (Figures 2 and 3);
- a plurality of photo-sensors 1 on the semiconductor region;
- a transfer register 2 extending in the vertical direction and formed in the semiconductor region which transfers (column 6, lines 5-9) signal charges accumulated in said photo-sensors (column 5, lines 49-51); and
- an impurity region 13 (horizontal gridlines between adjacent photodiodes in vertical direction) continuously **formed across substantially the entire region of the semiconductor region from one end of the semiconductor region to an opposite end of the semiconductor region** in a direction orthogonal to the transfer (vertical) direction of said transfer register (column 6, lines 39-52), wherein,
- said impurity region is provided at a position between said photo-sensors 1 adjacent to each other along the transfer direction of said transfer register in the semiconductor region

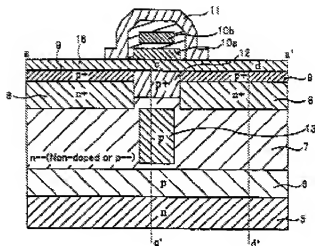


FIG. 2

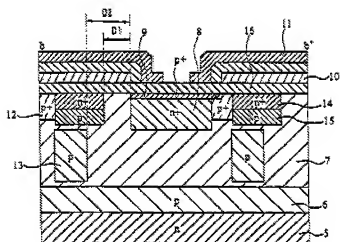


FIG. 3

8. **With respect to claim 3**, Inagaki (e.g. Figure 6) teaches a plurality of said impurity region portions (13a-13c) are formed in the semiconductor region (column 11, lines 4-8).

9. **With respect to claim 4**, Inagaki (e.g. Figure 2) teaches that a channel stop region 12 comprised of an impurity region is formed, separately from said impurity region, between said photo-sensors (photodiodes) adjacent to each other along the transfer (vertical) direction of said transfer register (column 6, lines 34-38) and in the vicinity of the surface of said semiconductor region.
10. **With respect to claim 6**, Inagaki (e.g. Figure 6) teaches that in addition to said impurity region portion 13, a first barrier region portion 15 comprised of an impurity region is provided at a position between said photo-sensors (photodiodes) adjacent to each other in the transfer direction of said transfer register and shallower relative to said impurity region portion as viewed from the semiconductor region (column 6, lines 46-49).
11. **With respect to claim 7**, Inagaki (e.g. Figure 1) teaches a second barrier layer 13 (vertical gridlines between adjacent photodiodes in horizontal direction) (column 6, lines 39-52) comprised of an impurity region portion formed along said transfer register.
12. **With respect to claim 11**, Inagaki teaches that said impurity region portion (13 horizontal gridlines) and the second barrier region portion (13 vertical gridlines) are located at the same depth (column 10, lines 56-64).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

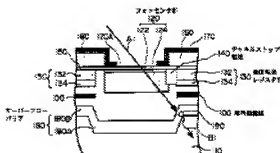
invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 5 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inagaki in view of Komatsu (JP 02002231924) (abstract) (hereinafter Komatsu).

15. **With respect to claims 5 and 8,** Inagaki remains as applied to claims 1 and 7 above, respectively.

Inagaki (e.g. Figures 2 and 3) further teaches an overflow barrier 6 formed between the semiconductor layer and the substrate.

Inagaki fails to teach that the overflow barrier is in a projected and recessed shape at an interface thereof in the direction of said substrate, and a projected portion of said projected and recessed shape is disposed at a position corresponding to a position between said photo-sensors. Komatsu teaches that the overflow barrier is in a projected (shallow) and recessed (deep) shape at an interface thereof in the direction of said substrate, and a projected portion of said projected and recessed shape is disposed at a position corresponding to a position between said photo-sensors (see abstract figure) in order to prevent color mixing and smear by limiting the move of a signal charge between adjacent photosensor sections.



It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the image pickup device of Inagaki with the overflow barrier of Komatsu for the benefit of preventing color mixing and smear by limiting the move of a signal charge between adjacent photosensor sections.

16. **With respect to claims 9 and 10**, Inagaki as modified by Komatsu remains as applied to claims 5 and 8 above, respectively. Inagaki further teaches that the impurity region portion 13 is higher than said overflow barrier 6 in impurity concentration (column 7, lines 48-51 and 55-58).

Response to Arguments

17. Applicant's arguments filed 11 November 2008 have been fully considered but they are not persuasive.

18. Regarding Applicant's response that Inagaki "fails to disclose or even fairly suggest an impurity region continuously formed across substantially the entire region of the semiconductor region from one end of the semiconductor region to an opposite end of the semiconductor region in a direction orthogonal to the transfer direction of said transfer register" because Inagaki "discloses a first impurity region 12 and a second impurity region 13 which run in a grid pattern" (remarks at page 7) and because as depicted in Figure 1 of Inagaki, "the horizontal impurity region of Inagaki are not continuous due to the intersection of the vertical impurity regions with the horizontal regions which segment the horizontal region into discrete sections" (remarks at page 10), initially, it is respectfully noted that impurity region 13, by itself, is formed in a grid-

like pattern (i.e., the grid-like pattern is formed by impurity region 13 at the same depth in both the vertical and horizontal directions (parallel to the substrate) and is not due to the crossing of the impurity region 12 and the impurity region 13) and it is the horizontal gridlines of impurity region 13 that are orthogonal to the transfer direction (column 6, lines 39-52). Because the solid state image pickup device of Inagaki is fabricated in a bottom-up manner by sequentially growing epitaxial layers upon a substrate and doping those layers to form impurity region 13 (second channel stop region) (column 9, lines 10-29), at the depth that impurity region 13 is formed, the horizontal lines of impurity region 13 are continuous. Impurity region 12 is formed above impurity region 13, and thus, does not intersect the horizontal gridlines of impurity region 13 (Figures 2 and 3).

19. Regarding Applicant's response that "Komatsu is an improper reference under 35 U.S.C. § 103(c)" (remarks at page 11), Applicant has not provided evidence in this file showing that the invention was owned by, or subject to an obligation of assignment to, the same entity as Komatsu, JP 2002231924 *at the time this invention was made, or was subject to a joint research agreement at the time this invention was made.* Moreover, reference Komatsu, JP 2002231924 additionally qualifies as prior art under another subsection of 35 U.S.C. 102 (35 U.S.C. 102(b)), and therefore, is not disqualified as prior art under 35 U.S.C. 103(c) (see MPEP 706.02(I)).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. Wendy Kuo whose telephone number is (571)270-

1859. The examiner can normally be reached Monday through Friday 7:00 AM to 4:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue A. Purvis can be reached on (571) 272-1236. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

W. Wendy Kuo
Examiner
Art Unit 2826

WWK

/Sue A. Purvis/

Supervisory Patent Examiner, Art Unit 2826